

APPENDIX "B"

ASPHALT CONCRETE PAVEMENT FOR STREET AND DRIVEWAY CONSTRUCTION

The work covered by these specifications consists of furnishing all labor, equipment, and materials, and performing all operations in connection with the construction of asphalt concrete pavement, in accord with these specifications and the applicable Improvement Drawings.

The asphaltic concrete pavement work shall consist of multiple layers of asphaltic concrete with or without granular base and subbase courses, constructed on a prepared sub-grade in general conformity with the lines, grades and cross-sections shown on the plans.

The data included herewith is based upon general soil conditions which exist in the area. These general soil conditions, representing approximately 75 percent of the soils in the area, are clayey overburden soils, described as lean to moderately plastic silty clays, classified according to the Unified Soil Classification System as CL soils. Any site which is made up of soils substantially different should be evaluated independently by Qualified Recognized Geotechnical Engineers. This work should consist of drilling, testing, and an engineering evaluation of all field and laboratory data, in light of the proposed design. Examples of substantially different soil conditions are the very silty clays or clayey silts along the floodplain of the Licking River.

ITEM 1.0 GRADING

This term shall consist of all grading above or below subgrade elevations of whatever nature required to bring the street to proper subgrade elevations, including necessary excavation for curb, gutter, sidewalk, construction of embankments, excavation and proper sloping of all cuts, and other work incidental thereto.

1.1 EXCAVATIONS: All excavations shall be made to approximate grade or subgrade elevations consistent with approved plans. Excavations shall not be steeper than a cut slope of 2.5 horizontal to 1 vertical.

1.2 EXCAVATION BELOW SUBGRADE: Whenever excavations below subgrade elevation to remove spongy or unstable material, organic matter, or other materials is required, the contractor shall remove same and shall replace with compactable soils as per Item 1.3. The excavation can be backfilled with soils that were removed, provided they are clean clayey soils free of organic

matter and other deleterious material, aerated, and dried to near optimum moisture content or clean clayey borrow soils that have moisture contents near optimum moisture content.

1.3 CONSTRUCTION OF EMBANKMENT: All surface vegetation and heavy root system shall be removed to eliminate all vegetation from the area upon which the embankment is to be constructed. Soils so removed shall not be used in construction of embankment. These materials shall be stockpiled and respread across scarified areas after the scarified areas have been brought to within inches of finished grade.

Embankments shall be constructed of approved soils to approximate subgrade elevation in shallow level layers, six (6) to eight (8) inches, within two (2) percent of optimum moisture content on the dry side of the curve or within three (3) percent of optimum moisture content on the wet side of the curve, compacted with an appropriate type of compaction equipment to a density not less than 95 percent of maximum density, as determined by the standard Proctor moisture-density test (ASTM D698-78 or AASHTO T-99) or 87 percent of maximum density as determined by the modified Proctor moisture-density test (ASTM D1557-58-78 or AASHTO T-180). Except as otherwise approved by a Qualified/Recognized Geotechnical Engineer, all soils placed in areas involving public improvements shall be constructed to slopes no steeper than 2.5 horizontal to 1 vertical and flatter where possible for ease of maintenance.

1.4 BACKFILL: Clayey soils or granular soils, shall be used to backfill utility crossings beneath and within three (3) feet on either side of the pavement, and compacted to the densities stated in Item 1.3. Under no conditions shall granular backfill be flushed with water to obtain compaction. Utilities which are parallel and within three (3) feet either side of the pavement shall be compacted.

1.5 SUBGRADE: The subgrade is defined as the top one (1) foot of the soil profile at finished grade prior to placing the pavement. This top one (1) foot of soil will consist of: a) compacted fill placed for embankments and as outlined in Item 1.3; b) undisturbed soils in transitional areas from cut to fill immediately below the topsoil; or c) undisturbed soils at depths greater than three (3) feet below the original ground surface in cut areas. The top one (1) foot of subgrade shall be compacted to 98 percent of maximum density as determined by the standard Proctor moisture-density test (ASTM D687-78 or AASHTO T-99) or 89 percent of maximum density as determined by the modified Proctor moisture-density test (ASTM D1557-78 or AASHTO T-180) within two (2) percent of optimum moisture content on the dry side of the curve or three (3) percent of optimum moisture content on the wet side of the curve immediately prior to placing the pavement. This specification is similar to the compaction requirement in compacted fill areas since the embankment shall be compacted to 95 percent or 87 percent of maximum density as determined by the standard Proctor or

modified Proctor moisture-density test, respectively. In transitional areas from cut to fill, the soils have been subject to seasonal changes of freezing and thawing, and wetting and drying. These soils will exist at moisture contents well above optimum moisture content and at densities on the order of 60 to 80 percent of maximum density (ASTM D698-78). These soils shall be scarified, aerated, and dried, in order to obtain the specified percent compaction for subgrade. Soils in cut areas, three (3) feet below original grade, will exist at moisture contents above optimum moisture content and at densities on the order of 90 percent of maximum density (ASTM D698-78). These soils shall be scarified, aerated, and dried in order to obtain the specified percent compaction for subgrade.

Any soft or yielding areas, resulting from high moisture content, that are encountered at the time of construction, shall be scarified, aerated, and dried to reduce the moisture content nearer to optimum moisture content, then recompacted to the specified density.

The subgrade shall be shaped to plan elevation and cross-section. Immediately prior to placing the pavement, the subgrade shall be checked for conformity with the cross-section shown on the plans by means of an approved template on the side forms. If necessary, the materials shall be removed or added, as required, to bring all portions of the subgrade to correct elevations. The subgrade shall be thoroughly compacted and again checked with the template. Pavement shall not be placed on any parts of the subgrade which have not been checked for correct elevation. The subgrade shall be clean of loose or wet material prior to placing pavement.

Prior to placing the pavement, the Contractor shall proofroll the compacted subgrade with a piece of heavy rubber tired equipment, such as a roadgrader loaded backhoe or a loaded single axle dump truck. The Inspector shall observe the proofrolling for consistency. Areas which are subject to excessive pumping or rutting shall be reworked and recompacted as described above.

1.6 EQUIPMENT FOR COMPACTION OF BACKFILL, EMBANKMENT, AND SUB-GRADE: Any compaction equipment capable of producing the required embankment and subgrade densities, without lamination, will be permitted. Clayey type or cohesive soils shall be compacted with a kneading type compaction equipment such as a sheepsfoot roller. Cohesionless soils shall be compacted with vibratory type equipment, such as a vibrating plate or roller. All compaction equipment shall be in good condition and shall be operated efficiently to assure uniform compaction.

1.7 SUBGRADE FOR SIDEWALKS AND DRIVEWAYS: Subgrade for driveways shall comply with Item 1.5 except soil density tests are not required. Cohesive soils or lean concrete shall be used under driveways (i.e., apron and sidewalk portion of driveway minimum eight (8) feet back of curb for single or two-family or nine (9) feet for multi-family or commercial) provided compaction is performed per Item 1.6. For sidewalks between driveways, subgrade of cohesive soils shall be uniformly compacted per Item 1.6. Cohesionless or granular soils may be used as a base on subgrade for sidewalks provided base thickness does not exceed four (4) inches or thickness equivalent to that of the sidewalk and compacted per Item 1.6.

1.8 EQUIPMENT OPERATED ON STREETS: The contractor shall be permitted to operate only pneumatic tired equipment over any paved street surfaces and shall be responsible for correcting any damage to street surfaces resulting from the contractor's operation. Paved streets adjacent to new development shall have all loose soil or mud removed at the end of each day's work.

1.9 UTILITIES: Special precautions shall be taken by the contractor to avoid damage to existing overhead and underground utilities. Before proceeding with work, the contractor shall confer with all public or private companies, agencies, or departments that own or operate utilities in the vicinity of the construction work. The contractor shall be diligent in his efforts to use every possible means to locate existing utilities.

1.10 SOIL DENSITY TESTS: Soil density tests, including moisture-density tests (ASTM D698-78 or ASTM D1557-78) and field density tests (ASTM D1556-64 or ASTM D2922-78), are required to determine the percent compaction in accord with the following:

(1) Embankments - a minimum of one (1) test for each three (3) feet in elevation per 400 lineal feet or every 2500 cubic yards, or fraction thereof, of embankment section;

(2) Utility backfill excavations for storm, sanitary sewer, and water system crossings - a minimum of one (1) test for each two (2) feet in elevation per 100 lineal feet, or fraction thereof, of utility trench open cut beneath street subgrade and within three (3) feet outside of street pavements;

(3) Subgrades - a minimum of one (1) test per 100 lineal feet for streets 500 lineal feet or less or one (1) test per 200 lineal feet for streets over 500 lineal feet at each of the following locations, where applicable:

(a) compacted fill placed for embankments;

(b) undisturbed soils in transitional areas from cut to fill immediately below the topsoil; and

(c) undisturbed soils at depths greater than 3 feet below the original ground in cut areas.

Density test of soil embankment, utility excavations, or subgrade are not applicable when at least one of the following conditions exist:

(1) more than five percent of the material contains greater than one (1) inch sieve size particles; or

(2) more than 60 percent of the material contains greater than No. 4 sieve size particles except DGA (dense graded aggregate).

Proof of conditions (1) or (2) shall be performed by at least one (1) graduation test by a recognized testing laboratory and mailed directly to the inspector.

All soil density testing shall be at the expense of the developer. The results of these tests shall be mailed directly to the developer, design engineer, inspector, and the contractor. The results of all soil testing shall be compared to the densities, stated in Items 1.3, 1.4, 1.5, and 1.7 of these regulations. Any deficiencies found in construction work must be remedied in the field or resolved between the developer, contractor, and inspector, subject to approval by a qualified registered professional engineer.

ITEM 2.0 PREPARATION OF EXISTING GRANULAR BASE COURSES FOR SURFACING

2.1 DESCRIPTION AND GENERAL REQUIREMENTS: In areas where granular base course has been placed as a previous stage of street or road construction, the contractor shall blade, shape, and compact the base course in conformance with the required dimensions, line, grade, and cross-section to permit completion of the paving work. When directed by the Inspector, additional base course aggregates shall be provided or excess aggregate removed and disposed of, by the Contractor, as to provide conformance with the required roadway section.

2.2 THICKNESS OF SURFACING REQUIRED FOR EXISTING GRANULAR BASE COURSES: The existing thickness of granular base comprises a portion of the required Design Thickness as specified in Item 4.2 Appendix "B" of these regulations.

ITEM 3.0 ASPHALT PAVEMENT

3.1 DESCRIPTION AND GENERAL REQUIREMENTS: This item shall consist of furnishing all materials and performing all construction procedures required to build an asphalt pavement, on a prepared and approved subgrade, conforming to the requirements of these specifications and to the pavement design shown on the approved plans. It may include any, or all, but is not necessarily limited to, materials and methods specified under Item 3 only.

Asphalt pavement shall consist of an asphalt concrete surface course, or courses, constructed on a base course, or courses and/or subbase course, designed in compliance with the requirements of Item 4.2 of Appendix "B" of these regulations.

Successive layers of the pavement shall be offset from the edge of the underlying layer, a distance equal to the course thickness of the lower layer, except when abutting existing construction. When the asphalt layers of the pavement abut a building foundation, barrier curb, or similar vertical surface, the abutting surface shall be heavily painted with asphalt prior to construction of the asphalt course. The surface course shall be finished one-fourth (1/4) inch above adjacent flush construction to permit proper compaction.

3.2.1 ASPHALT CONCRETE SURFACE COURSE: Asphalt Concrete Surface Course materials and construction shall conform to the current requirements of the Kentucky Department of Transportation, Bureau of Highways, for Asphalt Concrete Surface and Binder (Section 401, 402). Surface course mixture composition shall conform to the requirements Surface and Binder as set forth in Table B-1. Minimum Asphalt Concrete Surface, Binder and Bases Courses Thickness shall be as stated in Table B-2 of these regulations.

3.2.2 ASPHALT CONCRETE BASE COURSE: Asphalt Concrete Base Course materials and construction shall conform to the current requirements of the Kentucky Department of Transportation, Bureau of Highways, Specifications for Asphalt Concrete Base Course (Section 401, 403).

Composition requirements of the mixture shall conform to the gradation limits for Asphalt Concrete Base Course set forth in Table B-1. Asphalt content used shall fall within the range shown and shall be approved by the inspector.

3.2.3 CRUSHED AGGREGATE BASE COURSE:

3.2.3.1 DESCRIPTION: Crushed Aggregate Base Course, when provided for in the approved structural design of the pavement, shall consist of a granular layer constructed on prepared subgrade or subbase in accord with these specifications and in conformity with the approved dimensions, lines, grades, and cross-sections.

3.2.3.2 MATERIALS AND CONSTRUCTION METHODS: Crushed Aggregate Base Course shall conform to all the current requirements for materials and construction methods of the Kentucky Department of Transportation for Dense Graded Aggregate Base Course as per Section 303.

3.2.4 GRANULAR SUBBASE COURSE:

3.2.4.1 DESCRIPTION: Subbase, when provided for in the approved structural design of the pavement, shall consist of a granular layer conforming to the following material and construction specifications.

3.2.4.2 MATERIALS AND CONSTRUCTION METHODS: Crushed Aggregate Subbase Course shall conform to all the current requirements for materials and construction methods of the Kentucky Department of Transportation for Dense Graded Aggregate Subbase Course as per Section 303.

3.2.5 ASPHALT PRIME COAT: Asphalt Prime Coat shall be applied to the surface of granular courses upon which asphalt base or surface courses will be constructed.

Asphalt Prime shall conform to the Kentucky Department of Transportation requirements for Cutback Asphalt Emulsion Primer Type L, as per Section 407. Prime shall be applied to the surface of granular base course at a rate of 0.25 to 0.50 gallons per square yard, as directed by the inspector, in conformance with requirements of the referred to specification.

3.2.6 ASPHALT TACK COAT: Tack Coat shall consist of SS-1h, meeting the current requirements of the Kentucky Department of Transportation. It shall, when directed by the inspector, be diluted with equal parts of water. Application equipment and procedure shall conform to the requirements of the Kentucky Department of Transportation for Tack Coats as per Section 407. Tack Coat shall be applied to the surface of asphalt courses that have become dusty or dry from traffic use at a rate of 0.10 gallons per square yard of the diluted SS-1h before the subsequent course is constructed or in other circumstances when the inspector so directs.

ITEM 4.0 DESIGN OF ASPHALT PAVEMENT STRUCTURE

4.1 DESCRIPTION: Asphalt pavement structures for subdivision streets shall be designed in conformance with the requirements of this specification.

Thickness of the total pavement, and of component layers, shall be determined on the basis of Street Classification.

4.2 PAVEMENT THICKNESS REQUIREMENTS: Thickness of component layers of the pavement for streets within the right-of-way and of the total pavement structure shall be determined per Table B-2. Where streets are to serve industrial or commercial areas, pavement design shall be based on a study prepared by the subdivider's engineer projecting type of vehicles using said streets and traffic volumes, and approved by the planning commission's duly authorized representative.

ITEM 5.0 ADJUSTING MANHOLE TOPS

5.1 DESCRIPTION: The contractor shall raise or lower existing manhole tops to coincide with the finished grade elevation of the paving.

ITEM 6.0 JOINT SEALING COMPOUND

The material used for filling and sealing cracks and/or joints between concrete and/or asphalt shall be W. R. Meadows Sealtight #164 Hot Pour Rubber Asphalt Sealer or approved equal.

TABLE B-1
TABLE OF COMPOSITION LIMITS FOR BITUMINOUS CONCRETE

Sieve Size	Percent Passing by Weight		
	Base	Binder	Surface
1-1/2 in.	100		
1 in.	(2)		
3/4 in.	70-98	100	
1/2 in.	--	--	100
3/8 in.	44-76	57-85	80-100
No. 4	30-58	37-68	55-80
No. 8	21-45	25-52	35-60
No. 16	14-35	15-38	22-46
No. 50	5-20	5-20	5-21
No. 100	3-10	3-10	3-14
No. 200	--	--	2-7
Asphalt Content (1)	3.5-6.5	4.0-7.0	4-8

(1) Percent by weight of the total mixture.

(2) When the specified thickness of the Base course is 2 inches or less, either 100 percent of the aggregate shall pass the 1-inch sieve or the Contractor may request in writing to use Bituminous Concrete Binder. When the Contractor elects to use bituminous concrete binder in lieu of bituminous concrete base, all requirements for thickness and compaction (or density) will apply, the same as if bituminous concrete base was used.

TABLE B-2
THICKNESS REQUIREMENTS FOR ASPHALT PAVED STREETS

PAVEMENT DESIGN					
TOTAL MINIMUM THICKNESS (Method 1)			TOTAL MINIMUM THICKNESS (Method 2)		
STREET CLASSIFICATION	SURFACE (inch)	BASE (inch)	SURFACE (inch)	BASE (inch)	GRANULAR SUBBASE (inch)
Court					
Local	1- 1/2	2 @ 3-3/4"	1-1/2	3-1/2	9
Sub-Collector	1-1/2	2 @ 4-1/2"	1-1/2	4-1/2	10
Collector	1-1/2	2 @ 4-3/4"	1-1/2	5-1/2	11

NOTES:

- (1) Methods 1 and 2 will produce approximately the same pavement quality and strength.
- (2) Selection of the method shall be at the design engineer's option.
- (3) Designations pertinent to surface and binder and base courses used in this table correspond to the Kentucky Department of Highways Standard Specifications for Road and Bridge Construction:

Surface and Binder (State Highway Designation Section 401, 402)

Base (State Highway Designation Sections 401, 403) -- Each layer of bituminous concrete base shall be constructed to a compacted thickness no less than three inches nor more than five inches, unless otherwise directed by the inspector.

Granular base or granular subbase for Method 2 shall conform to composition limits specified in Sections 3.2.3 and 3.2.4. Each layer of granular base or sub-base shall be constructed to a compacted thickness no less than three inches nor more than eight inches, unless otherwise directed by the inspector.

- (4) Where streets are to serve industrial or commercial areas, the pavement design shall be based on a study prepared by the subdivider's engineer

projecting the type of vehicles using the street and traffic volumes approved by the planning commission's duly authorized representative.

- (5) Arterial streets shall be based on requirements of the Kentucky Department of Transportation.
- (6) Pavement thickness alternatives (Method 1 or 2) for LOCAL streets include COURTS and CUL-DE-SACS serving 50 lots or less.
- (7) Pavement thickness alternatives (Method 1 or 2) for SUB-COLLECTOR streets include LOCAL streets serving more than 50 lots.

ITEM 7 PAVEMENT THICKNESS MEASUREMENTS

Pavement thickness for each type street classification shall be as provided in Table 3. Streets that are subjected to exceptionally heavy truck traffic shall require a more complete detailed analysis by the subdivider's engineer and approved the Planning Commission.

Upon completing of the base, cores shall be taken at approximately 300 foot intervals alternating lanes, to determine pavement thickness. On streets less than 600 feet in length, a minimum of three (3) pavement cores shall be taken. A deviation of the specified thickness of 0.2 inches shall be tolerable. When the pavement thickness is less than the allowable deviation, additional pavement cores shall be taken at 25 foot intervals ahead, behind and across, until the specified thickness has been measured.

When the pavement thickness is less than the specified allowable deviation the developer shall have the following options:

- 1. Remove the pavement, retest the subgrade and replace the pavement to proper thickness.
- 2. After having satisfied all other County specifications pertaining to pavement construction (i.e., fill density testing, subgrade testing, etc.), the developer shall by the appropriate Legislative body a porting to the contract price. The contract price will be figured using the given variables below. This is similar to the procedure set forth in Section 501.28 of the Kentucky Transportation Cabinet's "Standard Specifications for Road and Bridge Construction, 1991 Edition".

When determining average contract price, the minimum deficient area to be used will be 50 linear feet, each lane being separate.

PAVEMENT DEFICIENCY

Deficiency in Thickness Determined by Cross (Inches)	Proportional Part of Contract Price Due to Appropriate Legislative Body
0.00" to 0.20"	0%
0.21" to 0.30"	20%
0.31" to 0.40"	40%
0.41" to 0.50"	60%
0.51" to 0.75"	80%
0.76" to 1.00"	100%

The minimum thickness allowed under this option is as follows:

<u>Designed Depth</u>	<u>Minimum Thickness</u>
7.0"	6.0"
8.0"	7.0"
9.0"	8.0"
10.0"	9.0"

Any pavement that has a thickness deficiency of more than 1" deviation will have to be replace, as stated in Option #1.

PAVEMENT DEFICIENCY

Deficiency in Thickness Determined by Cross (Inches)	Proportional Part of Contract Price Due to Appropriate Legislative Body
0.00" to 0.20"	0%
0.21" to 0.30"	20%
0.31" to 0.40"	40%
0.41" to 0.50"	60%
0.51" to 0.75"	80%
0.76" to 1.00"	100%

The minimum thickness allowed under this option is as follows:

<u>Designed Depth</u>	<u>Minimum Thickness</u>
7.0"	6.0"
8.0"	7.0"
9.0"	8.0"
10.0"	9.0"

Any pavement that has a thickness deficiency of more than 1" deviation will have to be replace, as stated in Option #1.